

CLAIMS:

1. A process for treating wood comprising:
 - a) impregnating the wood with a solution of furfuryl alcohol;
 - b) allowing the impregnated wood to sit so as to permit diffusion of the furfuryl alcohol solution into the wood; and
 - c) hot pressing the wood under conditions to effect polymerisation of the furfuryl alcohol within the wood.
2. A process according to claim 1, wherein the furfuryl alcohol solution includes an additive, preferably maleic acid, to facilitate polymerisation during hot pressing.
3. A process according to claim 2, wherein the furfuryl alcohol solution further comprises water, preferably in an amount of about 5% by volume.
4. A process according to claim 1, wherein the impregnating step a) comprises applying an initial vacuum to the wood followed by the application of pressure in the presence of the furfuryl alcohol solution.
5. A process according to claim 4, wherein the vacuum is applied at a pressure of from -90 to -95 kPa and wherein the pressure applied to the wood to facilitate impregnation of the furfuryl alcohol solution is from about 200 to about 1,000 kPa, preferably at least 300 kPa.
6. A process according to claim 1, wherein the diffusion step b) is conducted over a period of from about 3 to 5 days at ambient pressure and temperature.
7. A process according to claim 1, wherein the diffusion step b) is such that the wood swells up to about 22% per volume relative to the volume of the original wood sample.

- 20 -

8. A process according to claim 1, wherein the hot pressing step c) is conducted under conditions which will effect polymerisation of the furfuryl alcohol resulting in a three-dimensional chemical adhesive bond between the wood fibres.
- 5 9. A process according to claim 1, wherein the hot pressing step c) is conducted at a pressure of from about 5-30 MPa and a temperature of from about 170-200°C, preferably for a period of from about 5-15 minutes.
- 10 10. A process according to claim 1, including pretreating the wood to increase the permeability of the wood, preferably by microwave or steam treatments.
11. Wood when treated by the process according to claim 1.
- 15 12. A wood product including wood which has been impregnated with a furfuryl alcohol solution, the wood product having enhanced strength and elasticity characteristics relative to the untreated wood.
- 20 13. A wood product according to claim 12, having a crushing strength of at least 50 MPa, a modulus of elasticity of at least 35 GPa and a hardness of at least 25,000 N, preferably a modulus of elasticity of from 35-40 GPa and a hardness of from 25,000 to 30,000 N and drying cycle.
14. A process for preparing a wood based composite material comprising:
- 25 d) blending wood particles with a solution of furfuryl alcohol and furfuryl aldehyde; and
- e) hot pressing the blended wood under conditions to effect polymerisation of the furfuryl alcohol to facilitate adhesion of the wood particles.
- 30 15. A process according to claim 14, wherein the solution of furfuryl alcohol and furfuryl aldehyde comprises an additive, preferably maleic acid and water.

- 21 -

16. A process according to claim 15, wherein water is added in an amount of 5% by volume, based on the volume of the solution, to facilitate dissolution of the maleic acid in the solution.

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17. A process according to claim 14, wherein the blending of the wood particles with the solution of furfuryl alcohol and furfuryl aldehyde is conducted so that there is no significant penetration of the solution into the wood, the wood particles being substantially coated with the furfuryl alcohol and furfuryl aldehyde solution.

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18. A process according to claim 14, wherein the viscosity of the solution is from 150 to 200 centipoise.

19. A method according to claim 14, wherein the hot pressing step b) comprises the application of a pressure of from about 6-8 MPa.

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20. A composite material when prepared by the process according to claim 14.

21. A composite material comprising wood particles which are chemically adhered with a binder solution of furfuryl alcohol and furfuryl aldehyde, preferably a binder solution which comprises furfuryl alcohol, furfuryl aldehyde, an additive such as maleic acid and water.

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